SELECTED YEAST STRAINS (*SACCHAROMYCES CEREVISIAE*) WITH GLYCOLYTIC INEFFICIENCY AND METABOLIC INHIBITORS TO REDUCE ALCOHOLIC DEGREE IN VINES FROM WARM REGIONS

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Introduction

In warm regions potential alcoholic degree and unequilibrated must, especially in acidity are real problems to be resolved. Strains of *Saccharomyces cerevisiae* have different yields to produce ethanol from the same content of sugars. These peculiarities can be named glycolytic inefficiencies. We can select yeast strains with these properties in order to reduce the final alcoholic degree together with the production of some metabolic intermediates that can have repercussion in the sensorial profile like polyalcohols or organic acids (Figure 1).

The aim of this work was select *Saccharomyces cerevisiae* with low ethanol production and the detection and use of some metabolic inhibitors which are able to deviate the conventional glycolysis to the production of other molecules than ethanol.

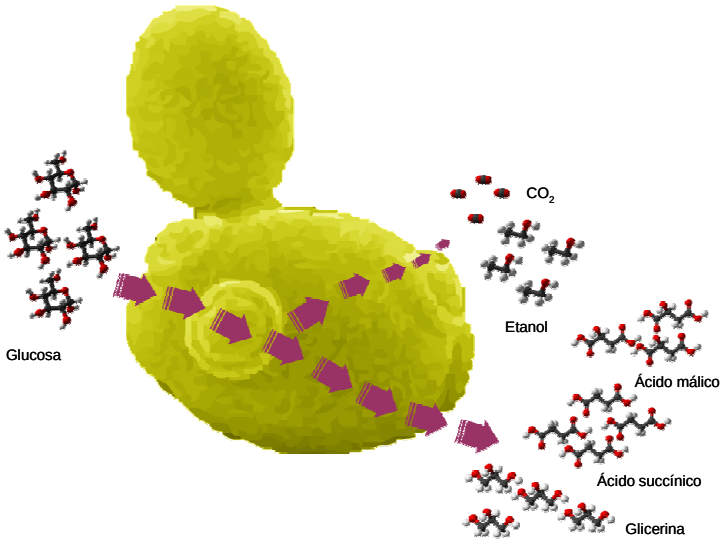

Figure 1 Decreasing ethanol and increasing of metabolites with sensorial repercussion in inefficient yeasts with glycolytic deviations

Materials & Methods

Glycolytic efficiency
Were fermented musts with a potential alcoholic degree of 12.5, 13.2 and using each yeast strain after a synchronization process. 1 mL of inocula was used to inoculate the fermentations over a volume of 60 mL. Al the fermentations were performed isotermically at 25 ºC and in triplicate.

Ethanol
Ethanol was measured by ebullometry.

Glycerin and residual sugars
Glycerin and residual sugars (glucose and fructose) were analyzed using enzymatic tests.

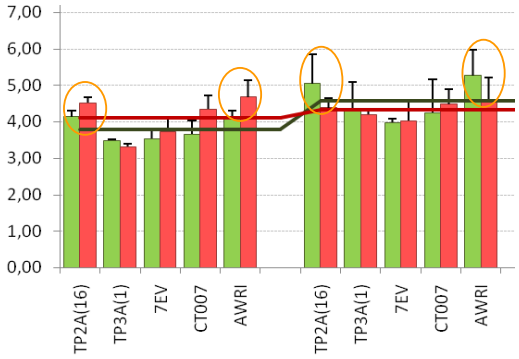

Figure 3 Glycerin in fermentations at 12.5 and 13.2 of potential alcohol (18 ºC green bars and 25 ºC red bars). Means±sd (n=3)

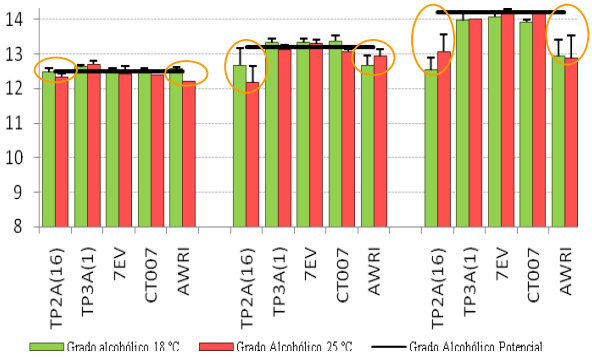

Figure 2 Alcoholic degree in fermentations at 18 ºC (green bars) and 25 ºC (red bars). Means±sd (n=3)

Results and Discussion

Figure 2 show the alcoholic degree reached in each fermentation. The more interesting yeast were those which finalizing the fermentation with low alcoholic degree and without residual sugars. The highlighted strains (TP2A16) had a low alcoholic degree compared with the value of reference and this was produced with a small amount of residual sugars. These yeast strains showed an alcoholic degree between 0.5-1.5 (depending on conditions) lower than the others. All of them have low amounts of residual sugars.

Figure 3 show the glycerin production of the yeasts. TP2A16 have higher production of this polyalcohol than others without glycolitic inefficiencies. Furfural inhibits some enzymes from the glycolytic pathway reducing the transformation of sugar in ethanol. Reduction of alcoholic degree is proportional to furfural concentration from 1 to 10 mg/L higher amounts don't have a bigger influence in the reduction of alcohol. The observed reduction can be about 0.5 º of ethanol.

Use of selected yeast strains with glycolytic unefficiencies can be a natural way to control the alcoholic degree in warm regions. This phenomena can be increased using metabolic inhibitors like furfural. Must be verified the residual amount of furfural in the wines produced using this technique.

References

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